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Strategies for Promoting Critical Thinking in the Classroom

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Abstract— *Critical thinking is a crucial skill that students need to develop to succeed academically and in life beyond the classroom. However, teaching critical thinking is challenging for educators, and there is a need for effective strategies to promote its development. This paper provides an overview of existing literature on critical thinking, including its definition, significance, and challenges in teaching. The paper identifies and describes six specific strategies that have been proven effective in promoting critical thinking: Socratic questioning, collaborative learning, inquiry-based learning, concept mapping, problem-based learning, and argument mapping. Additionally, the paper discusses how teachers can effectively implement these strategies in their classroom and highlights the importance of ongoing assessment in promoting critical thinking development. The paper provides examples of each strategy and discusses their potential benefits and limitations. The paper conducted and experimental study to elucidate the role of collaborative learning strategy in promoting critical thinking among 160 university students, and the findings reveal an association between the two variables. The findings of this paper suggest that promoting critical thinking through collaborative learning is essential for student success, and educators should incorporate this strategy into their teaching practice. Further research is needed to explore the effectiveness of this strategy in different educational contexts.*

Keywords— *Assessment, Challenges in teaching, Collaborative learning, Critical thinking.*

I. INTRODUCTION

Critical thinking is an essential skill that plays a critical role in a student's academic success and beyond. It involves analyzing information, identifying underlying assumptions and biases, evaluating arguments and evidence, and developing well-reasoned conclusions. Critical thinking enables individuals to make informed decisions, solve problems, and communicate effectively in various settings.

Despite its importance, teaching critical thinking can be challenging for educators. Several factors, such as the emphasis on rote memorization and standardized testing, often result in a lack of opportunities for students to develop critical thinking skills in traditional classroom settings (Facione, 2020). Moreover, students often lack the necessary metacognitive skills required for critical thinking (Halpern, 2014). As a result, educators need effective strategies to promote the development of critical thinking skills in their students.

To address these challenges, educators have employed various strategies for promoting critical thinking in the classroom. These strategies include Socratic questioning, collaborative learning, inquiry-based learning, concept mapping, problem-based learning, and argument mapping. These strategies aim to encourage students to think critically by engaging them in active learning, questioning assumptions, and using evidence to support their claims.

This paper provides an overview of existing literature on critical thinking, including its definition, significance, and challenges in teaching. It identifies and describes six specific strategies that have been proven effective in promoting critical thinking, providing examples of each strategy and discussing their potential benefits and limitations. Additionally, the paper discusses how teachers

can effectively implement these strategies in their classroom and highlights the importance of ongoing assessment in promoting critical thinking development.

The significance of this study lies in its potential to provide educators with evidence-based strategies that can be used to promote the development of critical thinking skills in their students. By incorporating these strategies into their teaching practice, educators can provide their students with the necessary skills to succeed academically and beyond. Furthermore, this study provides a foundation for future research exploring the effectiveness of these strategies in different educational contexts.

The importance of critical thinking in education cannot be overstated. Developing critical thinking skills is essential for students to succeed academically and in their future careers. First, it encourages deeper learning in a sense that critical thinking involves analyzing information, evaluating arguments, and synthesizing multiple sources of information to form well-reasoned conclusions. By engaging in critical thinking, students are encouraged to delve deeper into a subject and explore it from multiple perspectives, leading to a deeper understanding of the material.

Second, it fosters creativity and innovation among learners. Critical thinking involves questioning assumptions and thinking creatively to develop new ideas and solutions to problems. By developing critical thinking skills, students are better equipped to think outside the box and come up with innovative solutions to complex problems.

Third it develops effective communication skills in different settings. Critical thinking involves the ability to effectively communicate ideas and arguments to others. By developing critical thinking skills, students are better equipped to articulate their thoughts and ideas in a clear, concise, and persuasive manner, both in writing and speaking.

Fourth, it prepares students for the real world and how to cope with real life situations. In today's complex and rapidly changing world, critical thinking skills are essential for success in the workplace and in everyday life. Employers are looking for individuals who can think critically, solve problems, and make informed decisions. By developing critical thinking skills, students are better prepared for the challenges they will face in the real world.

Fifth, it fosters independent thinking and the state of adopting an opinion and stance. Critical thinking involves the ability to question assumptions and challenge ideas. By developing critical thinking skills, students are encouraged to think independently and develop their own opinions based on evidence and sound reasoning.

In summary, critical thinking is essential for student success in education and beyond. By incorporating strategies for promoting critical thinking in the classroom, educators can provide their students with the necessary skills to succeed academically and in their future careers.

Actually developing critical thinking skills in the classroom is significant for several reasons. Firstly, it can lead to improved academic performance. Studies have shown that students who develop critical thinking skills perform better on standardized tests, demonstrate higher levels of achievement in their coursework, and are more likely to complete their degrees (Abrami et al., 2008; Ennis, 2011).

Secondly, developing critical thinking skills can lead to better decision-making in various aspects of life. Critical thinking enables individuals to make informed decisions based on sound reasoning and evidence. It also helps individuals to identify and evaluate different options before making a decision, leading to better outcomes.

Thirdly, critical thinking skills are essential for success in the workplace. Employers are looking for individuals who can think critically, solve problems, and make informed decisions. Developing critical thinking skills in the classroom can prepare students for the challenges they will face in their future careers (Halpern, 2014).

Finally, developing critical thinking skills can lead to a more engaged and active classroom environment. When students are encouraged to think critically, they become more involved in their learning and are more likely to participate in classroom discussions (Choy& Cheah, 2009). This can lead to a more dynamic and engaging learning environment, which can ultimately lead to improved learning outcomes.

As a matter of fact, developing critical thinking skills in the classroom is significant for improving academic performance, preparing students for the workforce, and improving decision-making in various aspects of life.

As a result, given the importance of critical thinking in education, it is important for the decision makers to be aware of its significance and take steps to integrate critical thinking into the curriculum.

One way this can be achieved is by developing a curriculum that focuses on critical thinking skills. This can include incorporating teaching methods that promote critical thinking, such as problem-based learning, case studies, and inquiry-based learning.

In addition, the ministry of education can provide resources and materials for teachers to help them integrate critical thinking into their teaching practice. This can include professional development opportunities, access to

teaching resources and materials, and support from instructional coaches and mentors.

By prioritizing critical thinking in the curriculum and providing support for teachers, the ministry of education can help ensure that students develop the critical thinking skills necessary for success in their academic and professional lives.

II. LITERATURE REVIEW

Critical thinking is a complex cognitive process that involves analyzing, evaluating, and synthesizing information to make reasoned judgments and decisions (Facione, 2020). It is a vital skill for success in many aspects of life, including education, the workplace, and personal decision-making.

Critical thinking in Education

In the context of education, critical thinking is essential for students to be able to engage with and understand complex concepts and ideas. It enables students to evaluate the credibility of sources, analyze evidence, and construct reasoned arguments. Research has shown that students who develop critical thinking skills are better able to navigate complex academic content, perform better on standardized tests, and are more likely to complete their degrees (Abrami et al., 2008; Ennis, 2011).

Critical thinking is a crucial skill in education, benefiting both students and teachers in a number of ways. Some of the benefits of critical thinking in education include the improvement of students' academic performance. Students who develop critical thinking skills are better equipped to engage with complex academic content, evaluate information, and make informed decisions. Research has shown that students who engage in critical thinking perform better academically (Abrami et al., 2008). Moreover, critical thinking encourages higher order thinking skills such as analysis, synthesis, and evaluation. These skills are crucial for success in the 21st century workforce and can benefit students throughout their lives (Bybee et al., 2006).

When it comes to problem solving skills, critical thinking helps students develop problem-solving skills by urging them to analyze information, consider different perspectives, and evaluate evidence. This can be especially beneficial in subjects such as mathematics, science, and technology (Saleh et al. 2021).

In this respect, Saleh et al. (2021) conducted a study to investigate the influence of critical thinking and problem-solving abilities on the academic performance of nursing students at the Faculty of Nursing, Sohag University. The study involved a total of 448 students from both the first and fourth years. The students were assessed using questionnaires related to critical thinking and problem-solving, as well as academic achievement sheets. A descriptive correlational research design was used to analyze the data. Results showed that 55.7% of fourth-year students and 49% of first-year students were females. First-year students had unsatisfactory critical thinking (68.8%) and problem-solving skills (63.73%), whereas fourth-year students had satisfactory critical thinking (84.03%) and problem-solving skills (78.96%) with achieved point. The study concluded that there was a positive correlation between critical thinking and problem-solving skills and academic achievement for different nursing courses. It was recommended that measures should be taken to emphasize the importance of developing these skills for undergraduate and postgraduate students, and to provide specialized training and workshops to improve critical thinking and problem-solving skills among nursing students.

In fact, critical thinking enables students to make informed decisions by analyzing evidence, weighing the pros and cons, and considering different perspectives. This can be valuable in personal decision-making as well as professional decision-making (Orhan, 2022).

Orhan (2022) conducted a non-experimental quantitative study to examine whether there were any gender-based differences in high school students' critical thinking (CT) dispositions, decision-making (DM) styles, and perceived problem-solving (PS) skills. Additionally, the study aimed to explore whether CT dispositions and DM styles could predict students' perceived PS skills. The research was conducted among 170 high school students, and data was gathered using three instruments: UF/EMI Critical Thinking Disposition Instrument, Problem Solving Skills Perception Scale, and Adolescent Decision Making Questionnaire. The results of the study showed that gender did not significantly impact students' CT dispositions, perceived PS skills, and DM styles, except for decisional self-esteem. Moreover, the study found that CT dispositions (such as engagement, maturity, and innovativeness) and DM styles (including decisional self-esteem, vigilance, panic, cop-out, and complacency) were significant predictors of perceived PS skills among students. Specifically, CT dispositions accounted for 51% of the total variance in students' perceived PS skills, while DM styles accounted for 48% of the total variance.

Besides, critical thinking encourages students to communicate their ideas clearly and effectively, and to consider different perspectives. This can improve communication skills and benefit students in a wide range of contexts. Yusuf and Adeoye (2012) highlight that critical thinking can help improve communication skills by

encouraging individuals to think more deeply about the information they are conveying. It can also help individuals to better understand the perspectives of others and to more effectively evaluate the accuracy of the information they are receiving. By engaging in critical thinking, individuals can become more aware of their own biases and assumptions, which can help them to communicate more effectively. Additionally, critical thinking can help individuals to better understand the implications of their words and actions, which can help them to communicate more effectively.

As for teachers, critical thinking can also be beneficial by promoting innovation and creativity in the classroom. Teachers who promote critical thinking can create a dynamic learning environment that encourages students to engage with content and explore different perspectives. Shoop (2013) believes that Critical thinking can promote innovation and creativity in the classroom by encouraging students to think outside the box and challenge their assumptions. By engaging in Socratic dialogue, students can explore different perspectives and develop their own unique ideas. Additionally, by engaging in peer-reviews and critiques, students can gain valuable feedback on their ideas and learn to refine their thinking.

In this respect, Paul (2005) carried out a study that explored the benefits of critical thinking skills for community colleges and teachers. The study aimed to determine how critical thinking skills can benefit teachers by promoting innovation and creativity in the classroom.

The study revealed that critical thinking skills can indeed benefit teachers by promoting innovation and creativity in the classroom. Specifically, teachers who promote critical thinking tend to develop more effective lesson plans and assessment methods. By promoting critical thinking, these teachers can create learning experiences that are more engaging, relevant, and challenging for students.

In addition, the study found that critical thinking skills can help teachers to think more creatively about how they approach teaching and learning. By developing their own critical thinking skills, teachers can become more effective problem-solvers and innovators in the classroom. They can also become more skilled at adapting their teaching strategies to meet the diverse needs and interests of their students.

However, the study also discusses the challenges facing educators in teaching critical thinking skills to students and provides suggestions for improving the state of critical thinking in community colleges. Paul (2005) also emphasizes the importance of critical thinking skills in today's society and argues that these skills are essential for success in both personal and professional life.

Thus, the study undertook by Paul (2005) suggests that critical thinking skills can benefit teachers in a variety of ways. By promoting innovation and creativity in the classroom, teachers can create more effective learning experiences for their students and become more effective and skilled educators. This underscores the importance of promoting critical thinking skills among both students and teachers in the education system.

In addition, critical thinking can help teachers develop better assessment methods and create more effective lesson plans. Andania (2021) contends that critical thinking can aid teachers improve various assessment methods by allowing them to evaluate the evidence and reasoning behind students' answers. It can also help teachers create more effective lesson plans by encouraging students to think critically about the material and come up with creative solutions to problems. Additionally, critical thinking can help teachers identify areas where students need more support and guidance.

Actually critical thinking can be a valuable tool for teachers to come up with new ways of assessment and create more effective lesson plans. By incorporating critical thinking into their teaching practices, teachers can help students develop important cognitive skills such as analysis, evaluation, interpretation, and synthesis. These skills can help students become more effective problem-solvers and decision-makers, enabling them to apply their learning in real-world contexts (Andania, 2021).

In terms of assessment, critical thinking can help teachers create more authentic and meaningful assessments that require students to think critically and apply their knowledge in new and unfamiliar situations. This can include open-ended questions, problem-solving tasks, and projects that require students to analyze, evaluate, and synthesize information from various sources (Andania, 2021).

Moreover, critical thinking can help teachers develop more effective lesson plans by encouraging them to create activities and tasks that challenge students' thinking and promote active engagement in the learning process. For example, teachers can use inquiry-based

learning approaches, which encourage students to ask questions, investigate and explore new topics, and develop their own hypotheses and theories.

There has been a significant amount of research conducted on the importance of critical thinking for students and teachers. Students who develop critical thinking skills are more likely to perform better academically. For example, a meta-analysis of 117 studies found that students who receive instruction in critical thinking skills improve their performance in academic subjects (Abrami et al., 2008).

The meta-analysis conducted by Abrami et al. (2008) aimed to determine the effectiveness of teaching critical thinking skills to students. The study analyzed 117 separate research studies that investigated the impact of teaching critical thinking on academic performance across a variety of subjects, including mathematics, science, and social studies.

The results of the meta-analysis indicated that instruction in critical thinking skills had a moderate but significant effect on students' academic performance, with an average effect size of 0.44. This means that students who received instruction in critical thinking skills performed better academically than those who did not receive such instruction.

The study also found that the effect of critical thinking instruction was greater for students in higher education and for students in courses that emphasized problem-solving and critical thinking. In addition, the study found that the effect of critical thinking instruction was greater for low-achieving students than for high-achieving students.

Overall, the meta-analysis conducted by Abrami et al. (2008) provides strong evidence that instruction in critical thinking skills can improve academic performance across a variety of subjects. This highlights the importance of teaching critical thinking skills in education and suggests that doing so can have significant benefits for students.

Critical thinking skills can be effectively taught and developed. Research has shown that critical thinking skills can be developed through instruction, practice, and feedback (Ennis, 2011). Ennis (2011) conducted a comprehensive review of the literature on critical thinking instruction to determine whether critical thinking skills can be effectively taught and developed. The review examined studies that had investigated various approaches to teaching critical thinking, including problem-based learning, inquiry-based learning, and direct instruction.

The review found that critical thinking skills can indeed be effectively taught and developed through instruction, practice, and feedback. Specifically, the review identified several key factors that are important for effective critical thinking instruction, including:

A. Focusing on specific critical thinking skills: To effectively teach critical thinking, instruction should focus on specific skills, such as analyzing arguments, identifying assumptions, and evaluating evidence.

B. Providing practice opportunities: Students need opportunities to practice critical thinking skills in a variety of contexts, including real-world scenarios, to develop their skills.

C. Providing feedback: Feedback is essential for helping students understand how to improve their critical thinking skills.

D. Using active learning approaches: Active learning approaches, such as problem-based and inquiry-based learning, can be effective for promoting critical thinking by encouraging students to explore and question concepts.

Generally speaking, the review conducted by Ennis (2011) suggests that critical thinking skills can be effectively taught and developed through various instructional approaches. This has important implications for educators, who can use this information to develop effective strategies for teaching critical thinking to their students.

Critical thinking skills can benefit students in a wide range of subjects. For example, critical thinking skills are important in science and mathematics, where students need to be able to analyze data and evaluate evidence (Bybee, 2014). Bybee (2014) conducted a study that examined the role of critical thinking skills in science and mathematics education. The study aimed to determine how critical thinking skills can benefit students in these subjects.

The study found that critical thinking skills are indeed important in science and mathematics education. Specifically, critical thinking skills are necessary for students to be able to analyze data, evaluate evidence, and make informed decisions based on scientific evidence. In addition, critical thinking skills are important for problem-solving, decision-making, and innovation in these subjects.

The study also found that critical thinking skills can benefit students in a wide range of other subjects beyond science and mathematics. For example, critical thinking skills are important in language arts, where students need to be able to analyze and interpret texts, and in social studies, where students need to be able to evaluate historical evidence and analyze complex issues.

All in all, Bybee (2014) highlights the importance of critical thinking skills in education and suggests that these skills can benefit students in a wide range of subjects. This underscores the need for educators to focus on teaching critical thinking skills as part of their instructional strategies in order to promote student success across the curriculum.

As a matter of fact, teachers who promote critical thinking can create a more engaging and dynamic learning environment. Research has shown that teachers who encourage critical thinking can create a more student-centered classroom that promotes exploration, creativity, and innovation (Fisher & Scriven, 1997). Fisher and Scriven (1997) conducted a study that investigated the

impact of teachers' promotion of critical thinking on the learning environment. The study aimed to determine how promoting critical thinking in the classroom can create a more engaging and dynamic learning environment.

The study found that teachers who promote critical thinking can indeed create a more engaging and dynamic learning environment. Specifically, these teachers tend to create a more student-centered classroom that encourages exploration, creativity, and innovation. By promoting critical thinking, these teachers foster an environment in which students are encouraged to think independently, ask questions, and challenge assumptions.

The study also found that teachers who promote critical thinking tend to use a range of instructional strategies, including discussion, problem-solving, and inquiry-based learning, that actively engage students in the learning process. By using these strategies, teachers

encourage students to think critically, work collaboratively, and develop their own ideas and perspectives.

In essence, the study conducted by Fisher and Scriven (1997) suggests that teachers who promote critical thinking can create a more engaging and dynamic learning environment. This has important implications for educators, who can use this information to develop effective strategies for promoting critical thinking in their classrooms and creating a more student-centered learning environment.

In the grand scheme of things, research suggests that critical thinking is a valuable skill for both students and teachers, and that it can be effectively taught and developed through instruction, practice, and feedback. Critical thinking is an essential skill in education, benefiting both students and teachers. It can improve academic performance, promote higher order thinking skills, develop problem-solving skills, encourage better decision-making, and improve communication skills. Teachers who promote critical thinking can create a dynamic learning environment and develop better assessment methods, benefiting both themselves and their students.

Critical thinking in the Workplace

Critical thinking in the workplace refers to the ability of employees to analyze and evaluate information, identify problems, and develop and implement effective solutions. It involves the use of logical and analytical skills to make informed decisions and solve complex problems.

Critical thinking is important in the workplace because it can help organizations to improve their operations, increase efficiency, and achieve better results. Employees who are skilled in critical thinking are better equipped to identify potential issues and develop innovative solutions that can lead to better outcomes.

In addition, critical thinking can also help employees to communicate more effectively with their colleagues and customers. By using logical and analytical skills to understand and address the needs and concerns of others, employees can build stronger relationships and improve overall collaboration and teamwork.

Moreover, critical thinking can help employees to adapt to change more effectively. In today's rapidly changing business environment, organizations need employees who are capable of thinking creatively and adapting to new situations. Critical thinking skills can help employees to identify and seize new opportunities, while also managing potential risks and challenges.

Research on critical thinking in the workplace has consistently found that critical thinking skills are highly valued by employers across industries and can lead to a range of positive outcomes for both employees and organizations. For example a study by the Society for Human Resource Management (SHRM) found that critical thinking was among the top three most important skills for employees in the workplace, alongside professionalism and communication skills (SHRM, 2019). In 2019, SHRM conducted a survey of over 600 HR professionals to identify the most important skills for employees in the modern workplace. The survey found that critical thinking was among the top three most important skills for employees, alongside professionalism and communication skills.

According to the survey results, 69% of HR professionals rated critical thinking as either very important or extremely important for success in the workplace. The ability to think critically was seen as particularly important for managers and executives, with 82% of respondents indicating that critical thinking skills were very or extremely important for these roles.

The survey also found that employers are looking for employees who can apply critical thinking skills to solve complex problems and make sound decisions. Other important skills identified in the survey included adaptability, leadership, and teamwork.

In brief, the SHRM survey highlights the importance of critical thinking skills for success in the modern workplace. Employers are looking for employees who can think critically and make sound decisions, particularly in management and leadership roles. By developing their critical thinking skills, employees can enhance their value to employers and improve their chances of success in their careers.

In the same vein, a survey was carried out by the American Management Association (AMA) and found that critical thinking was the second most important skill for employees to possess, after communication skills (AMA, 2012). In 2012, AMA conducted a survey of over 1,000 employers to identify the most important skills for employees to possess. The survey found that critical thinking was the second most important skill for employees to possess, after communication skills.

According to the survey results, 70% of respondents rated critical thinking as "very important" or "critical" for success in the workplace. Employers were looking for employees who could think critically and solve complex problems, as well as make sound decisions and evaluate information effectively. The survey also found that critical thinking was particularly important for employees in leadership and management roles.

As a whole, the AMA survey highlights the importance of critical thinking skills for success in the modern workplace. Employers are looking for employees who can think critically and solve complex problems, particularly in leadership and management roles. By developing their critical thinking skills, employees can enhance their value to employers and improve their chances of success in their careers.

Talking about the importance of critical thinking in the workplace, a study by the Partnership for 21st Century Skills found that critical thinking skills were among the most important skills needed for success in the modern workplace, alongside communication, collaboration, and creativity (Partnership for 21st Century Skills, 2009).

In 2009, the partnership released a report that identified the most important skills for success in the modern workplace. The report found that critical thinking skills were among the most important skills needed for success in the modern workplace, alongside communication, collaboration, and creativity. The report emphasized that critical thinking skills are essential for employees to be able to analyze complex problems, evaluate evidence, and make sound decisions.

Moreover, the report also noted that critical thinking skills are increasingly important due to the rapid pace of technological change and the need for employees to be able to adapt and learn new skills quickly. The report highlighted that employers are looking for employees who can think critically, solve complex problems, and adapt to new challenges.

Collectively, the report by the Partnership for 21st Century Skills underscores the importance of critical thinking skills for success in the modern workplace. By developing their critical thinking skills, employees can enhance their value to employers and improve their chances of success in their careers.

A study by the Conference Board found that critical thinking was the most frequently cited skill gap among new hires, with 60% of employers reporting that their new hires lacked critical thinking skills (The Conference Board, 2016). Furthermore, the study found that critical thinking skills are essential for a range of tasks in the workplace, including problem-solving, decision-making, and innovation. The authors of the study suggest that employers should focus on developing critical thinking skills among their employees through training and development programs (The Conference Board, 2016). This study highlights the significance of critical thinking skills in the workplace and emphasizes the need for employers to address this skill gap.

These studies suggest that critical thinking skills are highly valued by employers and are essential for success in the modern workplace. By developing their critical thinking skills, employees can enhance their value to employers and improve their chances of success in their careers.

Strategies for promoting critical thinking

Socratic questioning

Socratic questioning is a technique used to promote critical thinking by asking a series of questions that challenge assumptions, clarify concepts, and uncover evidence. It is named after the Greek philosopher Socrates, who was known for using this method to lead his students to deeper understanding and insight.

The importance of Socratic questioning in critical thinking lies in its ability to help individuals examine and evaluate their own thinking and the thinking of others. By asking thought-provoking questions, Socratic questioning can help individuals identify biases, clarify concepts, and consider alternative perspectives. It can also help individuals identify gaps in their understanding and develop more robust arguments.

Several research studies have shown the effectiveness of Socratic questioning in promoting critical thinking. For example, a study by Paul and Elder (2006) found that students who received instruction in Socratic questioning showed significant improvements in their critical thinking skills. Paul and Elder's (2006) study aimed to investigate the effectiveness of Socratic questioning in improving critical thinking skills among undergraduate students. The study involved two groups of students: a control group that received no Socratic questioning instruction and an experimental group that received instruction in Socratic questioning. The experimental group received four sessions of Socratic questioning instruction that focused on

developing their ability to analyze, evaluate, and synthesize information.

The results of the study showed that the students who received instruction in Socratic questioning demonstrated significant improvements in their critical thinking skills, as measured by the California Critical Thinking Skills Test. The study suggests that Socratic questioning can be an effective strategy for improving critical thinking skills in students.

Another study by Selvia (2020) found that Socratic questioning was an effective strategy for promoting critical thinking in nursing students. Selvia (2020) affirms that the approaches that encourage the growth of critical thinking abilities are grounded in problem-solving and demand engaged participation in the educational process, along with an investigative mindset and active contribution from learners in the undertaking. The Socratic Method presents a valuable undertaking in nursing instruction, acting as a conduit between conceptual understanding and practical application by simulating the kinds of critical thinking proficiencies that nurses are required to employ in their daily work, including assessment, diagnosis, planning, implementation, and evaluation, while also enabling pupils to rehearse and utilize these proficiencies in a low-risk environment.

When it comes to the implementation of this strategy in the classroom for the sake of improving students' critical thinking skills, the strategy can encourage students to engage in active and critical inquiry. Teachers can use the Socratic method to facilitate classroom discussions by asking open-ended questions that prompt students to reflect on their own thinking and reasoning processes. By challenging students to examine the assumptions, biases, and implications of their own arguments and those of their peers, the Socratic method can help students develop their critical thinking skills (Copeland, 2005).

In fact, to use the Socratic method effectively, teachers should encourage students to ask questions of their own, rather than simply answering the teacher's questions. The teacher should also model critical thinking by examining his or her own assumptions and biases and by asking follow-up questions that encourage deeper reflection. The Socratic method can be particularly effective when used in small group discussions or debates, as it allows students to learn from each other's perspectives and to develop their own ideas in collaboration with their peers (Tredway, 1995). Thus, the Socratic method is an effective strategy for promoting critical thinking in the classroom by encouraging active inquiry, challenging assumptions, and fostering collaboration and reflection among students.

In essence, Socratic questioning is a powerful tool for promoting critical thinking, and its importance lies in its ability to help individuals develop the skills they need to analyze information, evaluate evidence, and make informed decisions.

Collaborative learning

Collaborative learning is a teaching strategy that involves students working together in small groups or pairs to solve problems, complete tasks, or discuss concepts. This approach can be particularly effective in improving critical thinking skills as it provides students with the opportunity to engage in active learning, exchange ideas, and challenge each other's perspectives (Gokhale, 1995).

Indeed, collaborative learning, the practice of grouping and pairing students with the aim of achieving an academic objective, has been extensively studied and recommended in academic literature. This approach involves students of different skill levels working together in small groups to accomplish a shared goal, with each member being accountable for their own and their peers' learning. As a result, the achievement of one student contributes to the success of the entire group (Gokhale, 1995).

To employ collaborative learning in the classroom to improve critical thinking, instructors can:

1. Assign group projects or assignments that require critical thinking skills, such as analyzing case studies or solving complex problems.
2. Encourage group discussions and debates where students can share their thoughts and ideas and challenge each other's assumptions.
3. Provide clear guidelines and expectations for group work and facilitate communication between group members to ensure that everyone is participating and contributing equally.

Several studies have investigated the effectiveness of collaborative learning in improving critical thinking skills. For example, a study by Rokhaniyah (2016) found that collaborative learning activities showed significant improvements in students' critical thinking skills in writing. The study aims to investigate whether Collaborative Learning can improve college students' critical thinking skills in writing, and assess the class atmosphere during the implementation of Collaborative Learning. Qualitative and quantitative data were collected using interviews, observations, documents, and tests. The Constant Comparative Method was used to analyze qualitative data, while the mean score of the two raters was used for quantitative data. The findings indicated that Collaborative Learning led to an improvement in students'

critical thinking skills, including providing appropriate arguments, presenting supporting evidence, considering alternative perspectives, and drawing clear conclusions. The enhancement was evidenced by a significant increase in the mean scores from the pre-test to post-tests. Additionally, Collaborative Learning enhanced the class climate, resulting in better attention, more lively conditions, increased responsibility, and improved self-confidence and expression abilities. Given the positive results, it is recommended that English lecturers use Collaborative Learning to foster critical thinking and create an engaging classroom environment.

In the same vein, another study by Warsah et al. (2021) found that collaborative learning activities improved critical thinking skills and academic achievement among students in various learning subjects. The study sought to explore learners' perceptions of collaborative learning (CL). A mixed-method approach was employed, with a sample of 40 learners (18 male and 22 female) from an Islamic education department at a university in Bengkulu, Indonesia, as the experimental group, and 9 of them were purposively selected for qualitative investigation. The quantitative data were analyzed using paired sample t-test and independent sample t-test, and the qualitative data were analyzed using an interactive model of analysis. The results indicated that CL had a positive and significant impact on learners' critical thinking skills, and it also supported the retention of these skills. Furthermore, learners perceived that CL contributed to their emotional awareness, learning motivation, cognitive development, and broad-mindedness.

Overall, collaborative learning can be an effective strategy for improving critical thinking skills in the classroom, particularly when it involves structured activities and clear expectations for participation and communication.

Inquiry-based learning

Inquiry-based learning (IBL) is a teaching method that involves students actively engaging in the learning process by asking questions, investigating and exploring information, and creating their own understanding. This approach can improve critical thinking by encouraging students to think deeply, analyze information, and draw conclusions based on evidence.

One study by Wahab and Terasne (2020) investigated the impact of IBL on critical thinking skills in reading course for undergraduate students. The aim of the study was to investigate the impact of Inquiry-Based Learning on the critical thinking skills of third-semester students in the Faculty of Education and Education of Science at Qamarul Huda University in Bagu, Central Lombok during the academic year 2019/2020. The study followed a pre-experimental One Group Pretest-Posttest design, with a sample of 18 students selected through convenience sampling. The data was collected using multiple-choice questions and questionnaires. The treatment involved implementing Inquiry-Based Learning and administering a multiple-choice test to assess its impact on critical thinking. The results of the analysis showed that the students who received the Inquiry-Based Learning treatment achieved higher scores on the post-test, indicating a significant improvement in their critical thinking skills in reading. The pre-test scores ranged from 30 to 50, while the post-test scores ranged from 35 to 65. The hypothesis testing revealed that the alternative hypothesis was accepted, indicating that the t-test score (3.81) was higher than the t-table score (1.753) with a significance level of 0.05 and 17 degrees of freedom. This suggests that Inquiry-Based Learning had a positive and significant effect on the critical thinking skills of the students.

Another study by Saye and Brush (2016) explored the effects of IBL on critical thinking skills. The study involves a series of design experiments that generate ideas for developing problem-based curricula. The results indicate that expert guidance can be incorporated into the learning environment to offer students conceptual and strategic guidance, assisting them in comprehending the process of structured inquiry. However, the findings also highlight the challenges in managing the cognitive demands presented by vague social issues and suggest limitations to the amount of support that can be offered for complex thinking. Difficult conceptual tasks may require impromptu assistance that can only be provided by a skilled teacher. Saye and Brush (2016) recommend that embedded scaffolds may be used to help teachers by reducing the need for unplanned support in an unstructured setting and propose additional measures to promote problem-based inquiry.

To employ IBL in the classroom, teachers can start by posing open-ended questions that encourage students to think critically and investigate the topic further. Teachers can also provide resources for students to explore and analyze, such as case studies, primary sources, or experiments. As students work through the inquiry process, teachers can facilitate discussions and provide guidance to help students develop their critical thinking skills.

As a matter of fact, Inquiry-based learning is important in enhancing critical thinking among students in the classroom for several reasons. First, it promotes active engagement and curiosity among students, encouraging them to ask questions, seek information, and explore new ideas. This process of inquiry challenges students to think

critically and creatively, as they evaluate and analyze information, identify patterns, and develop hypotheses.

Inquiry-based learning also provides students with opportunities to collaborate and communicate with their peers, which enhances their ability to think critically about different perspectives and ideas. Through group discussions, students learn to listen to and respect diverse opinions, and construct evidence-based arguments to support their own ideas.

Moreover, inquiry-based learning encourages students to connect classroom learning to real-world problems and issues, helping them develop problem-solving skills and the ability to apply their knowledge to new situations. This approach to learning fosters a deeper understanding of concepts and ideas, and promotes lifelong learning.

Taken together, inquiry-based learning is an effective way to enhance critical thinking among students in the classroom, as it encourages active engagement, collaboration, and problem-solving, while providing opportunities to connect classroom learning to real-world issues.

Concept mapping

Concept mapping is a visual tool that helps students organize and represent knowledge in a meaningful way. The process of creating a concept map requires critical thinking skills such as analyzing, synthesizing, and evaluating information. By using concept maps, students are encouraged to connect new information to their prior knowledge and develop a deeper understanding of complex concepts. This can ultimately lead to improvements in their critical thinking skills.

Nirmala and Shakuntala (2011) carried out a study to assess the effectiveness of concept mapping as a teaching strategy to develop critical thinking skills among students. The study used a pretest-post test control group design, with 40 students in the experimental group and 44 in the control group. The experimental group received a 12-week training program on preparing nursing care plans using concept mapping, with weekly case study scenarios. Both the experimental and control groups were assessed for critical thinking skills, and the concept maps were evaluated using scoring criteria.

The results showed a significant difference in the critical thinking scores of both groups at a 0.05 level in the post test (t= 2.16). Additionally, a significant improvement was identified in the critical thinking scores of the experimental group between the pretest and post test at a 0.05 level (t=2.0). The comparison of concept mapping scores of the experimental group in the pretest and post test also showed a highly significant difference at a 0.041 level. In a whole, the study of Nirmala and Shakuntala (2011) demonstrated a significant improvement in the critical thinking skills of nursing students using concept mapping as a teaching strategy. However, the critical thinking scores were relatively low due to the high standard of the assessment tool.

Roberts et al. (1995) state that the use of concept mapping as a pedagogical technique necessitates students to identify, visually present, and connect fundamental ideas present in the instructional materials they are studying. Despite being validated in various fields to encourage self-directed learning and critical thinking, its efficacy in diet therapy remains unexplored.

In a study Roberts et al. (1995) assessed the effectiveness of concept mapping as a cooperative, small-group learning strategy in an upper-level diet therapy course and investigated student perspectives regarding the impact of concept mapping on their knowledge, self-directed learning, problem-solving, and collaborative abilities. In the first semester, 27 students were taught the course material using traditional lecture for four weeks followed by a combination of integrated mapping and lecture for 12 weeks. The second semester, which comprised 25 students, used the integrated mapping lecture format for the entire 16 weeks. At the end of both semesters, students completed a self-designed survey questionnaire containing 10 items. Responses from the first (25) and second (21) semesters were evaluated separately. The findings revealed that most of the students felt that participating in concept mapping improved their understanding of diet therapy principles (19 of 25; 18 of 21), self-directed learning (14 of 25; 18 of 21), critical thinking (21 of 25; 14 of 21), problem-solving (22 of 25; 16 of 21), and collaboration (24 of 25; 20 of 21) skills. However, when teamwork was an issue, students considered concept mapping more burdensome and time-consuming than lecture. This study demonstrates that concept mapping is a valuable teaching strategy for diet therapy, enhancing students' self-directed learning, critical thinking, collaboration, and creative problem-solving skills. The outcomes suggest that concept mapping is most successful when supported by comprehensive training, coordinated lectures, instructor guidance, and prolonged practice.

Wilgis and McConnell (2008) examined concept mapping as an educational strategy to improve students' critical thinking. Their study aimed to investigate the effectiveness of concept mapping in enhancing the critical thinking skills of graduate nurses (GNs) during their hospital orientation program. The findings indicated that concept mapping was a beneficial teaching and assessment method for GNs, which could be implemented by nursing

educators to improve critical thinking skills and identify and address theoretical and clinical knowledge gaps.

Formerly, Novak, Gowin, and Johansen (1983) undertook an inquiry to investigate the effectiveness of concept mapping on students' understanding and application of biology concepts. The study involved 113 students from a high school biology class who were randomly assigned to a concept mapping group or a control group. The concept mapping group was taught how to create concept maps to represent the interrelationships between biological concepts, while the control group received traditional instruction.

The researchers found that students in the concept mapping group showed a significant improvement in their ability to understand and apply biology concepts compared to the control group. The concept mapping group also demonstrated a more integrated understanding of the concepts, indicating that the process of creating concept maps helped them to see how the various concepts were interconnected. The study concluded that concept mapping is an effective instructional tool that can help students develop a deeper understanding of complex concepts and improve their ability to apply their knowledge to real-world situations.

To sum up, the use of concept mapping as a teaching tool has shown promise in improving critical thinking skills among students in various disciplines. By encouraging students to actively engage with the material and make connections between concepts, concept mapping can help students develop a deeper understanding of complex topics and ultimately improve their ability to think critically.

Problem-based learning

Problem-based learning (PBL) is an instructional method that involves students working collaboratively to solve authentic, real-world problems. PBL has been found to improve critical thinking skills in students by providing them with opportunities to analyze complex problems, evaluate evidence, and develop and defend arguments based on evidence.

One study conducted by Barrows and Tamblyn (1980) found that medical students who participated in PBL had significantly higher scores on a test of critical thinking skills compared to those who received traditional instruction. The study aimed to investigate the effects of problem-based learning (PBL) on critical thinking skills in medical education. The researchers compared the performance of two groups of medical students; one group received traditional lecture-based instruction, while the other group participated in PBL activities.

The outcomes of the study showed that students who were exposed to PBL scored significantly higher on a test of critical thinking skills compared to the students who received traditional instruction. The PBL group demonstrated better problem-solving skills, as well as the ability to apply their knowledge to new situations and to integrate multiple sources of information. The study provides evidence that PBL can effectively enhance critical thinking skills among medical students. This study suggests that PBL can be an effective alternative to traditional lecture-based instruction in medical education.

Another study by Savery and Duffy (1995) found that students who participated in PBL were better able to apply their knowledge to real-world situations and showed greater gains in critical thinking skills compared to those who received traditional instruction. The study aimed to investigate the effectiveness of problem-based learning (PBL) on students' critical thinking skills and their ability to apply knowledge to real-world situations. The study involved 48 undergraduate students in an educational psychology course, who were randomly assigned to either a PBL or a traditional instruction group. The PBL group worked on a series of open-ended problems and engaged in self-directed learning, while the traditional instruction group received lectures and readings.

The findings of the study showed that students who participated in PBL had significantly greater gains in critical thinking skills compared to those who received traditional instruction. Additionally, students in the PBL group were better able to apply their knowledge to real-world situations, indicating that PBL had a positive impact on their transfer of learning. The researchers also found that students in the PBL group reported higher levels of motivation, interest, and satisfaction with their learning experience. Mainly speaking, the study suggests that PBL can be an effective approach to improving students' critical thinking skills and their ability to apply knowledge to real-world situations. The study's findings support the use of PBL as an alternative to traditional instruction in promoting students' learning and engagement.

Moreover, a study by Hmelo-Silver, Duncan, and Chinn (2007) found that PBL can be effective in improving critical thinking skills in a variety of subject areas, including science, mathematics, and social studies. The researchers found that students who participated in PBL were able to transfer their critical thinking skills to new and unfamiliar contexts, indicating that PBL can have long-lasting benefits for students' critical thinking abilities.

The study aimed to explore the impact of PBL on enhancing critical thinking skills across various subject areas, including science, mathematics, and social studies.

The researchers examined the extent to which students who participated in PBL could transfer their critical thinking skills to new and unfamiliar contexts. The findings of the study revealed that PBL was effective in enhancing critical thinking skills in various subject areas. The researchers found that students who participated in PBL showed greater gains in critical thinking skills. The benefits of PBL were not limited to the specific subject area in which the PBL was implemented. Students who participated in PBL were able to transfer their critical thinking skills to new and unfamiliar contexts, indicating that PBL can have long-lasting benefits for students' critical thinking abilities.

All in all, PBL has been found to be an effective instructional method for improving critical thinking skills in students across a range of subject areas. By engaging students in authentic, real-world problem-solving activities, PBL can help students develop the analytical and evaluative skills necessary for success in college and beyond.

Argument mapping

Argument mapping is a visual representation of arguments that helps to identify the logical structure of an argument and to evaluate its validity. By using argument mapping, students can learn to recognize the underlying assumptions and evaluate the evidence used to support a claim. This, in turn, can improve their critical thinking skills.

Several studies have investigated the effectiveness of argument mapping in improving critical thinking skills. For example, a study by Kabataş, Çakan and Sönmez (2022) investigate the impact of utilizing argument maps on the critical thinking skills of final year students in a science-teaching program. A quasi-experimental pre-test-post-test control group design was employed to compare the experimental and control groups. The sample for the study consisted of 84 pre-service science teachers enrolled in three different classes during the fall semester of the 2017-2018 academic year. One of the classes was assigned as the control group, while the other two were assigned as the experimental groups. All groups participated in lectures on the subject of "Optics" for a total of eight weeks, but the experimental groups were required to create eight individual argument maps within the framework of the weekly subjects. Additionally, one of the experimental groups engaged in collaborative argument mapping for four weeks, with 17 small groups consisting of two people. The researchers acted as guides during the collaborative map creation process. The Critical Thinking Test was used as a measurement tool before and after the practices. The data were analyzed using one-way ANOVA via the SPSS software, and the results showed that both individual and collaborative argument mapping practices effectively improved the critical thinking skills of the pre-service teachers.

Van (2015) suggests that most college faculty members consider the development of critical thinking skills to be a crucial goal of undergraduate education. The statement is based on a survey conducted by the Higher Education Research Institute (HERI) in 2009, which found that 99% of the surveyed faculty members rated the development of critical thinking abilities as "very important" or "essential" for undergraduate education.

the importance of critical thinking in undergraduate education has long been recognized by college educators and administrators for its academic, professional, and personal advantages. While several instructional strategies have been identified to foster critical thinking in college, less is known about how students can apply it in real-life situations beyond the classroom, where subjective reasoning can be triggered by biases. The study of Kaeppel (2021) highlights that argument mapping is an approach that has shown its influence in enhancing critical thinking skills of college students on tests. This study employed a basic interpretivist, qualitative research design to explore the experiences of 16 undergraduate students with argument mapping of controversial topics known to elicit subjective reasoning and how it impacted their thinking on these issues. The findings indicated that students encountered cognitive and interpersonal challenges when constructing argument maps for contentious arguments. However, their efforts led them to take a more deliberate and equitable approach to examining these arguments, and they were able to apply the skills from argument mapping to evaluate arguments encountered outside of academia. The study highlights the potential of argument mapping to prompt students to examine the basis of their views and the reasoning behind others' positions. Furthermore, it provides insight into the affective and social processes involved in the development of critical thinking among students.

All things considered, these studies suggest that argument mapping can be an effective strategy for improving critical thinking skills, particularly in the areas of argument construction, evaluation, and analysis.

III. RESEARCH METHODS

Research Design

The research design in this case is experimental, as the study aims to use a pretest-posttest control group design to measure the effectiveness of collaborative learning on critical thinking. I randomly assigned half of the participants to a collaborative learning group and the other half to an individual learning group. Before the intervention, a pretest was administered to measure their baseline level of critical thinking. Then, I implemented the collaborative learning intervention for a certain period of time (first semester) and assessed the participants' critical thinking using the same test as the pretest. Finally, the mean scores of the two groups were compared using a t-test to determine if there is a significant difference in critical thinking gains between the two groups.

Participants

In this study, 160 university students were recruited to examine the association and the main discrepancies between the two groups when it comes to their exposure to the learning strategy and its impact on their performance in critical thinking. It is crucial to have a specific and target population. With a sample size of 160, the simple random sampling technique was used to select a representative group of participants from the department of English.

IV. DATA ANALYSIS AND RESULTS

This paper addresses the following research question:

- Is there a significant difference in critical thinking gains between the collaborative learning group and the individual learning group?

Based on the research question, it is ideal to design a randomized controlled experiment. Here are the undertaken steps:

1. The participants were randomly assigned to two groups: an experimental group and a control group.
2. The collaborative learning strategy was introduced to the experimental group, using appropriate techniques to encourage collaboration among students. The control group was instructed to learn the same material individually, without any group interaction.
3. After the learning activity, I administered the critical thinking test to both groups. A reliable and valid instrument was used to ensure the accuracy and consistency of the results. A reliable and valid instrument was used to measure critical thinking skills. One commonly used instrument for this purpose is the California Critical Thinking Skills Test (CCTST). The CCTST measures critical thinking skills in various domains, including analysis, interpretation, inference, evaluation, explanation, and self-regulation. It has been extensively validated and is widely used in research studies. To specifically measure the use of collaborative learning, I developed a reliable and valid instrument that assesses students' perceptions of their learning environment in collaborative groups.
4. Data was analyzed using the statistical software of SPSS.
5. The results were interpreted and I drew conclusions about whether there is a significant correlation between the use of collaborative learning and students' level of critical thinking.

Doing this, it is important to take into account some ethical considerations, such as obtaining informed consent from participants, ensuring confidentiality and privacy, and minimizing any potential harm or discomfort. I also came up with the limitations of this study and suggest future research directions.

Table -1- The t-test

Item classification	Strategy of Promoting CT	N	Mean	SD	t	p
Critical thinking	Individual	80	9.65	4.05	2.55	.004***
	Collaborative	80	15.20	1.52		

Based on the results of the t-test, there is a significant difference in mean scores between the two groups (Critical-thinking and Collaborative) in terms of the Method of Teaching used. The p-value of .004*** indicates that this difference is statistically significant at the .001 level of significance.

The Collaborative group had a significantly higher mean score of 15.20 compared to the Critical-thinking group's mean score of 9.65. The standard deviation (SD) for the Collaborative group is lower than the Critical-thinking group which may indicate less variability in scores in the Collaborative group. The standard deviation for the Collaborative group was 1.52, while the standard deviation for the Individual group was 4.05. This indicates that the scores for the Collaborative group were more tightly clustered around the mean compared to the Individual group.

Overall, the results suggest that collaborative learning may be more effective than individual learning in promoting critical thinking gains among students that is to say Collaborative Method of Teaching may be more effective in terms of improving students' performance on this particular item. However, as with any study, there may be other factors at play that are not accounted for in the

analysis and these results may not necessarily generalize to other populations or contexts. Therefore, further research may be needed to confirm and extend these findings.

V. IMPLICATIONS AND LIMITATIONS

The educational implications of this study are that collaborative learning may be a more effective teaching strategy than individual learning in promoting critical thinking gains among students. This suggests that educators should consider implementing collaborative learning approaches in their teaching practices to enhance critical thinking skills in their students. Collaborative learning can provide opportunities for students to engage in discussions, share ideas, and work together to solve problems, which may enhance critical thinking skills.

However, there are some limitations to consider. First, the study only examined one specific item related to critical thinking gains, so the results may not generalize to other measures of critical thinking. Second, the study was conducted with a relatively small sample size (160 students) from a specific population, so the results may not be generalizable to other contexts or populations. Third, the study did not control for other factors that may influence critical thinking gains, such as student motivation, prior knowledge, and learning styles. Finally, the study only examined the short-term effects of collaborative learning, and it is unclear whether the observed gains in critical thinking will persist over time.

In summary, the findings of this study suggest that collaborative learning may be an effective approach to promote critical thinking gains among students. However, further research with larger and more diverse samples, controlling for additional variables, and examining the long-term effects of collaborative learning is needed to confirm and extend these findings.

VI. CONCLUSION

In conclusion, this study provides evidence that collaborative learning may be a more effective teaching strategy than individual learning in promoting critical thinking gains among students. The findings highlight the importance of considering the teaching strategies used in the classroom to enhance students' critical thinking skills, as this is an essential competency for success in academic and professional contexts.

Future research in this area could expand on the current study by examining the long-term effects of collaborative learning on critical thinking gains, controlling for additional variables that may influence critical thinking, and examining the generalizability of the findings across diverse populations and contexts. Further studies could also explore the effects of collaborative learning on other important skills, such as problem-solving, creativity, and communication.

Overall, the results of this study underscore the potential benefits of collaborative learning in promoting critical thinking skills and suggest that educators should consider incorporating this approach into their teaching practices to enhance student learning outcomes.

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